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BOMBS FOR COMBAT AIRCRAFT. THE PROVEN AND THE NEW AT THE PARIS--ETC(U)

JAN 62 J REICH

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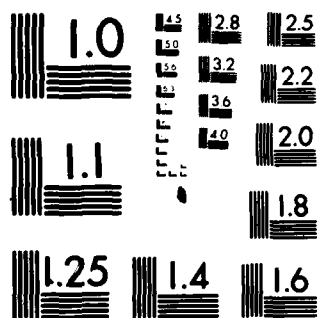
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**BOMBS FOR COMBAT AIRCRAFT:**  
The Proven and the New at the Paris-Le Bourget Air Show

[Reich, Juergen, LTCOL; Abwurfaffen fuer Kampfflugzeuge: Bewaehrtes und Neues auf der Luffahrtsstellung Paris-Le Bourget; Soldat und Technik, No. 9, 1981; pp. 515-517; German]

The 34th Salon Aeronautique in Le Bourget, held this year and on which we /515\* reported in the August (1981) issue, was the largest air show to date in the world. It was especially the heavy equipment exhibited which attracted the visitors, and the daily flying exhibitions thrilled the viewers. The accessories industries especially showed their products less spectacularly in the exhibit halls than the aircraft manufacturers did in the open spaces. Yet it was there that a profusion of new items was presented for the expert, among which, perhaps, the most revolutionary of the entire exhibit was the attitude and navigation instruments with a CRT, shown for the first time. Western weapons manufacturers who presented a plethora of proven weapons and new developments, were among the exhibitors in the military area. This following article on bombs is intended as a supplement to our report in the August issue.

Let us say it right off: the proven "iron bomb" found on modern combat aircraft, like the "mailman delivering a letter with a Rolls Royce" (General (ret.) Steinhoff), is still with us. It will, moreover, also keep its justification for existence for certain targets because improved bombsights permit a more accurate drop and the higher load capacity of modern aircraft makes it possible to deliver a high weapons effect on the target within a short period of time. Thus, bombs today are as a rule secured to multiple bomb racks which permit suspension with the least possible air resistance. Leaving out the laser-guided bombs, the aerial bombs available today can be divided into the following categories:

- retarded and unretarded multi-purpose bombs;
- airfield attack bombs;
- cluster and scatter bombs.

#### Retarded and Unretarded Multi-purpose Bombs

Multi-purpose bombs of 100 lbs up to 1000 lbs were offered by SAMP (Fig. 1), MATRA, and Luchaire. Since an unretarded bomb must be dropped from steep approach angles and rather great altitudes for reasons of target accuracy and threat to the aircraft, something which automatically results in a greater threat to the aircraft from the anti-aircraft defense, the trend is more and more toward the retarded /516 bomb. Those bombs can be released with greater accuracy and without threat to the aircraft in low-level flight. Nearly all manufacturers are, therefore, offering a retarder system for their weapons or provisions for later installation. British Hunting Ltd. is proposing a retarder system for nearly all bombs of American or British manufacture. That system consists of swing-out metal spoilers and a parachute (Fig. 2). The retarder system of MATRA consists of a parachute inserted in the after section of the bomb (Fig. 3). Luchaire offers a similar system. The system which can be installed in all conventional bombs consists of a sort of balloon which is inflated by the airstream (Fig. 4). Aerodynamically well configured double, triple, and quadruple carriers for 14-inch bomb racks are being offered especially for the 250-kg bombs. Alkan and Rafaut have special developments for the Alpha Jet and Mirage families, and they also have multiple carriers for other aircraft types (Fig. 5-9).

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\*Numbers in right hand margin indicate pagination in the original text.

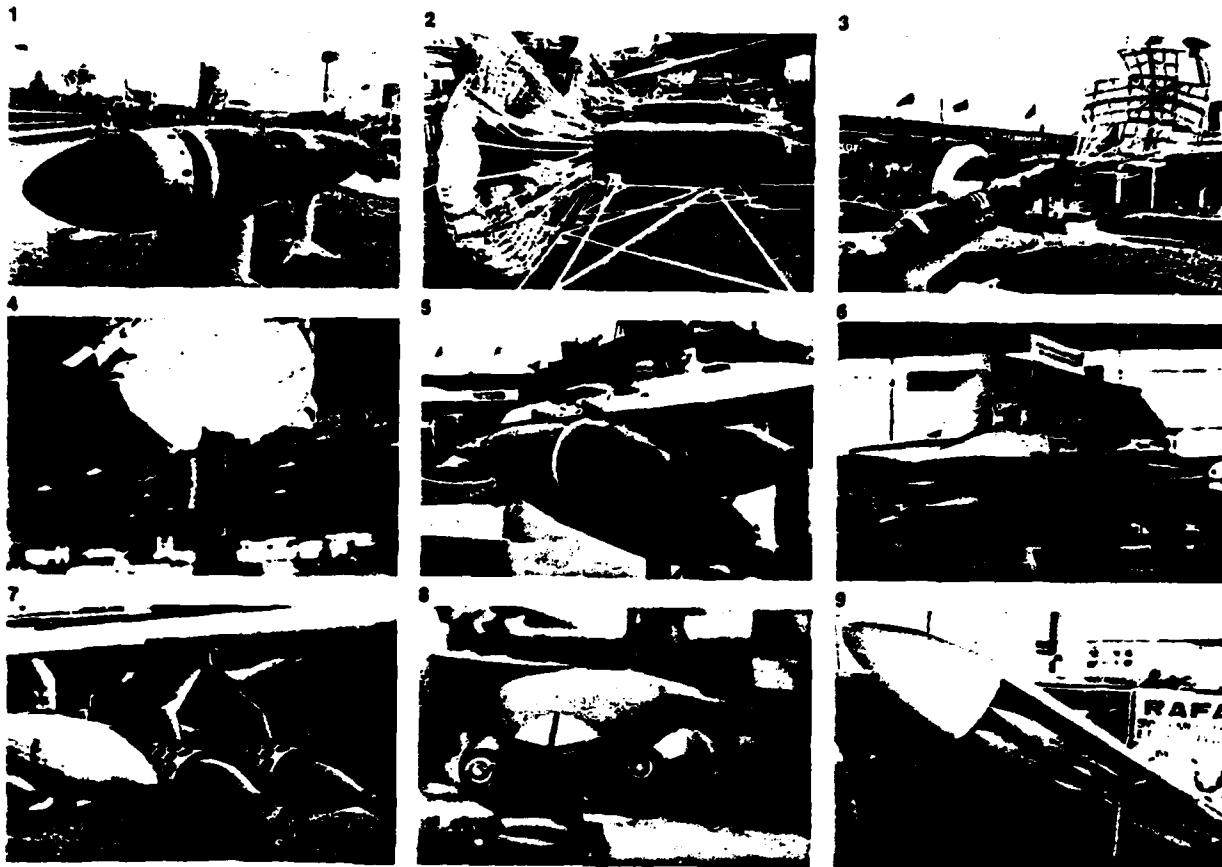


Fig. 1. Ballistic 1000-kg bomb by SAMP; Fig. 2. Retarder system by Hunting Engineering on a 1000-lb bomb; Fig. 3. Retarded 250-kg bomb by SAMP with MATRA retarder system; Fig. 4. The retarder system of Luchaire on a 250-kg bomb; Fig. 5. 250-kg bombs on an ALKAN triple carrier; Fig. 6. Alpha Jet pylon with Rafaut double carrier for two 250-kg bombs; Fig. 7. Rafaut double carrier, here with two BELUGAs on inboard wing pylon of an Alpha Jet; Fig. 8. ALKAN quadruple carrier with four 250-kg bombs on an inboard pylon of a Mirage F-1; Fig. 9. Quadruple carrier for up to 50-kg practice bombs by Rafaut.

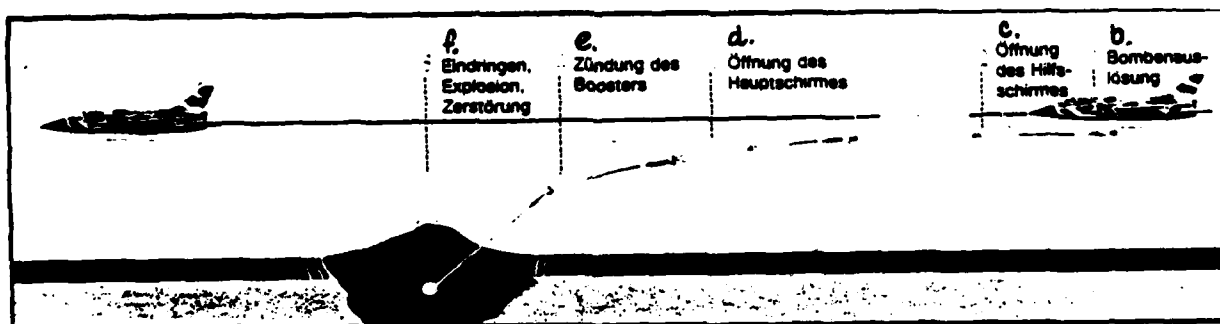


Fig. 10. Functional sequence of the Durandal (a)  
 b. Bombs are released c. Auxiliary parachute opens d. Main parachute opens  
 e. Booster ignites f. Penetration, explosion, destruction

## Airfield Attack

Now that aircraft in greater numbers are being protected in hardened shelters and can be damaged only with a relatively large expenditure of weapons, the only possibility exists in denying the enemy the use of his aircraft by making the runways unusable for long periods of time. Multi-purpose bombs are unsuited for that purpose, since they cause damage to the runways which can be quickly repaired.

Therefore, for some years development has been going over to special bombs which can cause larger craters in the reinforced-concrete construction. A prerequisite for that is that the bombs penetrate deeply enough into the concrete before they explode. The 195-kg (430-lb) Durandal made by MATRA is retarded by a braking parachute shortly after it is released and is brought into the vertical direction. Then the parachute is separated and a booster accelerates the bomb, which penetrates into the concrete and explodes after a long delay. The bomb can be employed to a minimum altitude of 50 m and destroys about 150-200 m<sup>2</sup> of concrete (Fig. 10). The somewhat heavier (330 kg) Spanish EXPAL BRFA operates on the same principle.

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Bild 11: „Airfield Attack System JP-233“ von Hunting Engineering

Bild 12: BAP 100 von Thomson-Brandt

Bild 13: Alpha-Jet mit 6 x BL 755 von Hunting Engineering

Bild 14: 3 BELUGA an den Flügelstationen einer Jaguar

Bild 15: BAT 100 von Thomson-Brandt in zwei Paketen von je neun Bomben am inneren Flügelpylon einer A-10

Bild 16: Verbesserte Luft-Boden-Perzessorbwehrwaffe von Hunting Engineering

Bild 17: TORNADO mit MV1 unter der Rumpfstation

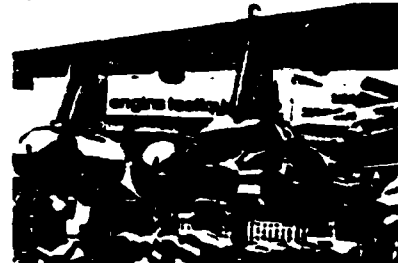
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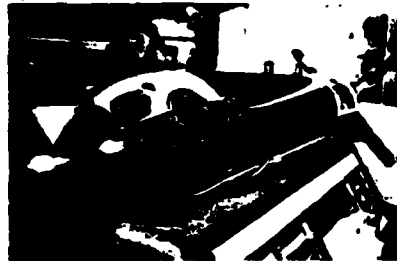
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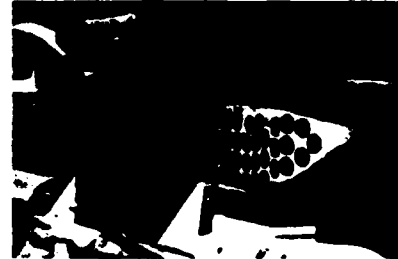


Fig. 11. JP-233 Airfield Attack System by Hunting Engineering Fig. 12. BAP 100 by Thomson-Brandt Fig. 13. Alpha Jet with 6 x BL 755 by Hunting Engineering Fig. 14. 3 BELUGAs on the wing stations of a Jaguar Fig. 15. BAT 100 by Thomson-Brandt in two clusters of nine bombs each on the inboard wing pylon of an A-10. Fig. 16. Improved Air-to-Surface AT weapon by Hunting Engineering. Fig. 17. TORNADO with MV1 under the fuselage station.

The JP-233 Airfield Attack System is being developed specially for TORNADO by Hunting Engineering, but it can also be employed by other aircraft. In its

application it is similar to the MW1 developed by MBB. So far it is known that it contains concrete-breaking bomblets and mines with time fuzes with delays of various lengths in order to delay the repair of the runways as long as possible /517 (Fig. 11).

Finally, the 100-kg BAP (airfield attack bombs) 100 which are dropped in clusters should be mentioned as a new development of Thomson-Brandt.

#### Cluster Bombs

Cluster bombs with bomblets of various types dropped by aircraft are used primarily to destroy enemy concentrations with armored and unarmored vehicles and also to mine suspected main lines of advance.

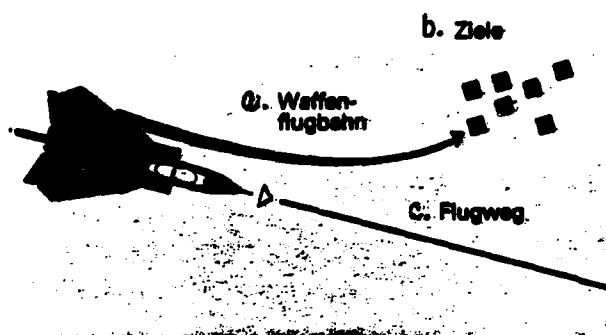


Fig. 18. Offset capability of the "improved air-to-surface antitank weapon" by Hunting Engineering

a. Weapon trajectory b. Targets  
c. Flight path

The 277-kg (610-1b) BL 755 cluster bomb built by Hunting Engineering and introduced into nearly all the NATO air forces is an effective weapon against armored and unarmored targets. Each bomb contains 147 bomblets, which are ejected by the gas pressure from a gas cartridge after the bomb is released. The bomblets are effective against armor up to 250 mm thick. The effect against unarmored targets is considerable owing to the fragmentation action (Fig. 13).

The BELUGA from MATRA, which weighs 290 kg and contains 151 bomblets, functions in a similar manner and contains multi-purpose, anti-armor, and interdiction bomblets. The BELUGA is retarded by a braking parachute after it is dropped, and then the bomblets are ejected by gas pressure. A bomb has a choice of ejection speed, a scatter area of 40 x 240 m or 40 x 120 m (Fig. 14).

The BAT 100 (anti-tank bomb) of Thomson-Brandt represents a new development. This is a 100-kg bomb with an armor-piercing action which is dropped in clusters of up to nine bombs (Fig. 15). An item without a specific designation is an "improved air-to-surface antitank weapon" by Hunting Engineering which has a certain offset capability and is, therefore, not subject to the restrictions of ballistic bombs (Fig. 16). The principle of its employment is shown in Fig. 18. The weapon has an autonomous navigation system into which the target data are fed immediately before it is dropped from the aircraft. After release, the weapon is completely autonomous. After a controlled flight phase, the bomblets are ejected by centrifugal force. The bomblets then home independently onto the target (Fig. 19) after the target is detected by sensors. In this connection we should not forget the MW1 of MBB, which at this time is generally regarded as the most effective scatter bomb (Fig. 17).

#### Summary

The Paris-Le Bourget Air Show of this year proved that great efforts are being put forth especially in the area of airfield attack bombs and scatter bombs

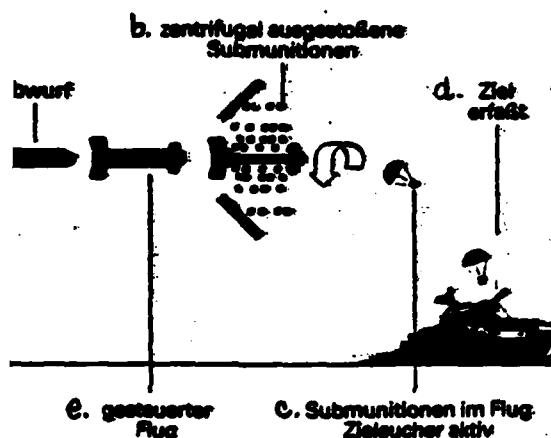


Fig. 19. Manner of operation of the "improved air-to-surface antitank weapon"

- a. Release
- b. Bomblets ejected by centrifugal force
- c. Bomblet in flight, target seeker active
- d. Target detected
- e. Controlled flight

bomblets to make the new developments ready for production and to market them. Recently a great demand is expected here, since airfield attack bombs do not exist in the arsenals of the air forces of the world. The increasing opening of bases requires such weapons. Scatter and cluster bombs for hard and targets will also have a greater spectrum of employment owing to the improved ability of the bomblets.



